ROYAL GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

No. 98.] FEBRUARY. [1895.

CCCCXXXVIII.—COFFEE CULTIVATION AT THE GOLD COAST.

Coffee cultivation in West Africa is gradually extending. In the lowlands the plant chiefly cultivated is *Coffea liberica ;* but a small-berried form of *Coffea arabica* is also grown. The beans of this are very small, but the produce when well cleaned has been valued as high as 94*s.* per cwt. For the hills of the interior the best plant is undoubtedly the robust *C. arabica* grown in the Blue Mountains of Jamaica. This has large heavy beans, often fetching from the best estates 140*s.* per cwt. There is no danger of introducing disease with this coffee.

Several private coffee plantations have been started at the Gold Coast (*Kew Bulletin*, 1892, p. 300). Those at Aburi at the Botanic Station have also been noticed (*Kew Bulletin*, 1895, p. 11). The following correspondence communicated to Kew by the Secretary of State for the Colonies affords information of a coffee and cacao plantation of a moderately large size in course of being established near Cape Coast Castle :—

COLONIAL OFFICE to ROYAL GARDENS, KEW.

Colonial Office, Downing Street,
February 2, 1895.

SIR,

I AM directed by the Secretary of State for the Colonies to transmit to you, for your information, the accompanying extract from a despatch from the Governor of the Gold Coast Colony, with an account of Messrs. Miller Brothers and Company's coffee plantation at Kuby Kul, near Cape Coast.

I am, &c.
(Signed) R. H. MEADE.

The Director,
Royal Gardens, Kew.

(Enclosure.)

EXTRACT from Despatch from the Governor of the Gold Coast, No. 14 of the 8th January 1895.

An interesting account is given by Mr. Holmes of Messrs. Miller Brothers and Company's coffee plantation at Kuby Kul, which is about 10 miles inland from Cape Coast. About 150 acres have been cleared

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and planted with coffee and cacao, and the first yield was obtained in 1893. The actual cost of the plantation has been 2,400*l.*, and with this modest expenditure the plantation will undoubtedly prove a very profitable undertaking. I enclose an extract of the portion of Mr. Holmes's report which refers to the plantation, in case your Lordship should wish to send it to the Director of the Royal Gardens at Kew.

(Extract.)

District Commissioner's Office,
Cape Coast, October 13, 1894.

* * * *

I have visited Messrs. Miller Brother and Company's plantation at Kuby Kul twice during the quarter by the kind permission of their courteous agent, Mr. Batty. The estate consists of a commodious house and drying sheds and about 450 acres. It is situated about 10 miles inland. The Cape Coast Sefwhi main road (which is now being constructed by the Government) skirts the west side and the old Amin road to Denkera the other. The highest elevation is about 150 feet above the sea level. I first visited the plantation in 1892, when there were only about 20 acres planted with cacao and Liberian coffee ; the other part was covered with thick bush and forest. The plantation is only four years old, the first planting from the nursery being in June 1890. The estate has been increased year by year in areas of about 50 acres at a time, and the rearing of plants and planting out, &c. has proceeded as under :—

Year.	No. of Cacao Plants reared.	No. of Coffee Plants reared.	Number planted.	Yield of Cacao.	Yield of Coffee.
1890 -	500	3,000	Planted out.	—	—
1891 -	1,500	3,000	„	—	—
1892 -	2,000	15,000	„	—	—
1893 -	2,500	3,000	„	2½ cwt.	18 cwt.
1894 -	1,500	1,500	„	Crop in progress of picking and curing.	
	8,000	25,500	25,500	—	—
In nursery	1,500	15,000	—	—	—
	9,500	40,500	—	—	—

The coffee trees are planted out 13 feet square apart, but I think it has been found from experience that 10 feet would be ample. There are about 30 acres now cleared which remain to be planted. The valleys have been utilized for the cacao and the elevated portions for coffee. At present there are roughly 150 acres fully planted with trees which are of the following respective ages, viz. :—

20 acres coffee, 4 years old.
2½ „ cacao, 4 „
(One acre of these trees were brought from Aburi Botanical Gardens.)
60 acres coffee, 3 years old.
20 „ cacao, 2 „
25 „ coffee, 2 „
15 „ cacao, 1½ „
10 „ „ has been planted this year.

The first crop from the older trees was picked in 1893. This year about one-half the plantation is in bearing. The cacao shows signs of bearing in its third year from seedling, and the coffee two years from time of planting out from the nursery. Before the whole of the 150 acres will begin to yield a return three years must yet elapse.

The cost of clearing forest, planting out, and weeding for the first four years is on an average of about 4*l.* per annum per acre. That is to say, an estate of 150 acres in the fourth year would represent 2,400*l.* capital spent on cultivation. This includes the cost of management and all expenses of labour, but not cost of plants or first cost of the land; after the fourth year it is reckoned that the cost will fall to 3*l.*, and in the seventh year to 2*l.* This is accounted for by the growth of the trees giving sufficient shade to cover the whole of the ground, thus causing less weeding. It is now calculated that one man can keep 3 acres clean, and the cost of that labour is about 9*l.* per head per annum. The weeds are well kept down throughout the estate, and the surface of the ground kept regularly tilled by Krooboy and native labour with the use of a hoe. Under such careful management insects or fungoid disease, &c. do not appear to cause any trouble, and in the month of September the trees were a perfect picture of health and vigour, the young trees being in full bloom. Mr. Batty everywhere acts according to the maxim that what is worth doing is worth doing well.

Cacao-curing.—The beans are fermented for three days, then placed on shelves in the drying house for two days. After that they are exposed to the sun direct for two or three weeks until thoroughly dry.

Coffee-curing.—At present the dry process is adopted, but when the yield increases the usual wet process will be used. The berries are now placed on the drying ground first, as they are picked from the trees and allowed to remain there for a period of six weeks, and when dry they are pounded in mortars by hand till the husks and parchment come off.

(Signed) J. R. Holmes,
District Commissioner.

CCCCXXXIX.—DECADES KEWENSES.

Plantarum Novarum in Herbario Horti Regii Conservatarum.

DECAS XIII.

This decade consists of descriptions of new plants collected by Mr. Maurice S. Evans, of Natal, during a trip made in July 1894 to the Drakensberg, for the purpose of exploring some caves formerly occupied by the Bushmen. The part of the Drakensberg Range where they were collected lies between Cathkin Peak and Giants Castle, at an elevation of 6,000 to 9,000 feet above the sea, among the sources of the Bushman's River. This region is about the highest part of the Drakensberg, and has scarcely been visited by a collector before, hence it was only to be expected that the collection should contain several novelties. Practically very little of the Drakensberg has been explored botanically,

and none of it thoroughly, but from the collections made by various botanists whilst crossing the Range at various points, it is evident that it contains a very rich and varied Flora, and those plants here described are mostly very distinct in character from any others yet known to science in the different genera to which they belong. Perhaps the most interesting among them is the *Gymnopentzia*, which adds a second species to the genus and brings that genus within the Natal Flora. The *Nestlera* and *Athrixia* are also remarkably distinct and interesting plants. The *Gerbera* is one of the smaller species of the genus, and its flowers have very much the appearance of the common Daisy. The *Sebæa* is remarkable for its creeping stems and perennial habit, and is well worthy of introduction into cultivation. It is to be hoped that Mr. Evans will, on future occasions, bring to light many more of the interesting plants that are doubtless hidden away in the nooks of the Drakensberg.

121. **Hermannia malvæfolia**, *N. E. Brown* [Sterculiaceæ]; ramis elongatis decumbentibus vel procumbentibus pilis stellatis asperatis, foliis petiolatis orbicularibus basi cordatis crenatis stellato-tomentosis viridibus, stipulis ovatis acutis, floribus solitariis foliis oppositis, pedicellis medio bracteatis, bractea amplectante apice bifida stellato-tomentosa, calyce campanulato fere ad medium acute quinquefido stellato-tomentoso et glanduloso, petalis obovatis obtusis basi cymbiformibus luteis extus basi stellato-pubescentibus, staminibus inclusis, filamentis planis supra medium bituberculatis tuberculis pilosis, antheris acuminatis bifidis marginibus ciliatis, ovario stellato-tomentoso, stylo elongato glabro.

Habitat.—Natal: on the Drakensberg, Bushman's River, 6,000–7,000 ft. alt., growing among dry grass, July, *Evans*, 55.

Caules 1–2 ped. longi, ½–1 lin. crassi. *Foliorum* petioli 2–7 lin. longi, laminæ 3–11 lin. diam. *Pedicelli* 2–3½ lin. longi. *Bracteæ* 1 lin. longæ. *Calycis* tubus 1½ lin. longus, lobi 1¼ lin. longi. *Petala* 4 lin. longa, 1½ lin. lata.

This is quite unlike any other species in the genus; the leaves resemble those of *Malva rotundifolia*, L., but are smaller, and not at all lobed.

122. **Helichrysum album**, *N. E. Brown* [Compositæ]; foliis radicalibus dense rosulatis obovatis vel rotundato-obovatis obtusis caulinis erectis elliptico-oblongis obtusis subamplexicaulibus concavis floccoso-lanatis, pedunculo gracili scapiformi monocephalo paucifolioso floccoso-lanato, capitulo magno multifloro, involucri bracteis lanceolatis acutis niveis basi rubro-purpureis nitidis bracteis radiantibus quam discus subtriplo longioribus, receptaculo fimbriato-foveolato obscure denticulato, corolla 5-dentata glabra, pappi setis deciduis apice clavato-barbatis, achæniis turgidis glabris.

Habitat.—Natal: on the Drakensberg at Bushman's River Pass, near the snow line, 7,000–8,000 ft., *Evans*, 48.

Folia radicalia ½–1½ poll. longa, 4–8 lin. lata, caulina 5–7 lin. longa, 2–3 lin. lata. *Pedunculi* 2–4 poll. longi. *Capitula* 1–1¼ poll. diam. *Involucri* bracteæ 4–6 lin. longæ, 1–1½ lin. latæ. *Corolla* 1½ lin. longa. *Achænia* ⅔ lin. longa.

A dwarf species, possibly of tufted habit, allied to *H. adenocarpum*, DC., and *H. marginatum*, DC. From the one-headed forms of the former it differs by its more slender, scape-like peduncles, obovate obtuse leaves, which are more densely rosulate, and the glabrous achenes. From the latter by its much broader obovate leaves and very different indumentum.

123. **Helichrysum confertum**, *N. E. Brown;* suffruticulosa caulibus ramosissimis, ramis brevibus confertis dense albo-lanatis, foliis dense confertis parvis elliptico- vel oblongo-spathulatis obtusis breviter et late petiolatis canaliculatis dense albo-lanatis, capitulis plerumque 3–5 (raro 1–2) ad apices ramorum sessilibus circa 30-floris, involucri campanulati glabri bracteis adpressis exterioribus gradatim minoribus elliptico-oblongis obtusis pallide brunneis interioribus oblongis obtusis albis opacis quam discus duplo longioribus subradiantibus, receptaculo parvo fimbrillato-denticulato, corollæ 5-dentatæ dentibus extus papillato-barbatis, pappi setis apice incrassatis scabris, ovariis papillatis.

Habitat.—Natal: on the Drakensberg, near Bushman's River, 6,000–7,000 ft., *Evans*, 49.

Folia cum petiolo 2½–4½ lin. longa, 2–3 lin. lata. *Capitula* 4–5 lin. diam. *Involucri* bracteæ exteriores 1–2 lin. longæ, ¾–1 lin. latæ, interiores 3–4 lin. longæ, ¾–1¼ lin. latæ. *Corolla* 1½ lin. longa.

A very distinct species, unlike any other in the genus, the nearest approach to it being *H. Youngii*, Hook. fil., an alpine New Zealand species. It appears to be a dwarf species of compact habit, with woody stems ⅛–⅙ in. thick, having short, densely crowded branchlets at their ends, densely clothed with white woolly leaves. Mr. Evans states that it grows "in shrubby clumps."

124. **Nestlera virgata**, *N. E. Brown* [Compositæ]; caulibus erectis gracilibus simplicibus vel apice brevissime ramosis hispidulis brunneis, foliis alternis fasciculatis linearibus subcanaliculatis acutis mucronulatis hispidis, capitulis sessilibus terminalibus solitariis vel pluribus in ramulis brevibus lateralibus versus apicem caulium racemosis multifloris, involucri campanulati bracteis linearibus acuminatis scariosis brunneis glabris exterioribus gradatim minoribus, receptaculo epaleaceo foveolato, floribus radii 18–22 uniseriatis involucro longioribus lineari-oblongis obtusis tridenticulatis supra luteis subtus fusco-purpureis inferne glandulosis, floribus disci tubulosis 5-dentatis glandulosis luteis, antheris basi longe caudatis, pappi squamis brevibus in cupulam dentatam plus minusve connatis, ovariis radii adpresse pubescentibus, disci glabris.

Habitat.—Natal: on the Drakensberg, 6000–7000 ft. alt., July, *Evans*, 50.

Caules 7–16 poll. alti. *Folia* 2–5 lin. longa, ⅓–1 lin. lata. *Capitula* 7–8 lin. diam. *Involucri* bracteæ interiores 5 lin. longæ, ½–¾ lin. latæ. *Corollæ* radii 4½–5 lin. longæ, 1 lin. latæ, disci 2¾ lin. longa. *Pappus* ¼ lin. longus.

A well marked plant, quite unlike any other in the genus, and somewhat resembling a *Relhania* in general appearance, but the receptacle is without paleæ.

125. **Athrixia pinifolia**, *N. E. Brown* [Compositæ]; fruticosa, ramis teretibus erectis inferne basibus foliorum delapsorum plus minusve vestitis, foliis confertis sessilibus adscendentibus subrigidis linearibus acutis dorso convexis marginibus scabrido-ciliatis glabris, pedunculo monocephalo prope apicem ramorum solitario quam folia plerumque longiore dense scabro-pubescente, capitulo circa 100-floro, involucri campanulati bracteis multiseriatis sublaxis lanceolatis vel subspathulato-lanceolatis acutis apice plus minusve recurvis scariosis brunneis basi viridibus glabris exterioribus gradatim minoribus, receptaculo plano nudo, floribus radii lineari-oblongis apice minute tridentatis involucrum excedentibus albis subtus purpureo-vittatis, floribus disci tubulosis superne ampliatis breviter 5-dentatis luteis glabris, pappi setis uniseriatis asperis, ovariis pubescentibus.

Habitat.—Natal: on the Drakensberg, in the bed of the Bushman's River, among boulders, July, *Evans*, 59.

Frutex 2–3 ped. altus. *Folia* 1–1½ poll. longa, ½–1 lin. lata. *Pedunculi* 9–18 lin. longi. *Capitula* 9 lin. diam. *Involucri* bracteæ interiores 4 lin. longæ, ½ lin. latæ. *Corollæ* radii 4 lin. longæ, disci 2 lin. longæ.

A very distinct species, with the habit of certain species of *Relhania* and *Nestlera acerosa*, Haw.

126. **Printzia laxa**, *N. E. Brown* [Compositæ]; ramis gracilibus apice albo-tomentosis, foliis alternis petiolatis ellipticis vel elliptico-ovatis acutis mucronulatis basi cuneato-acutis marginibus mucronulato-dentatis supra viridibus sparsissime arachnoideis subtus albido-tomentosis, capitulis magnis solitariis terminalibus radiatis multifloris, involucri campanulati bracteis 5–6-seriatis exterioribus gradatim minoribus lanceolatis acutis apice pubescentibus ciliatis fuscisque, floribus radii lineari-ligulatis apice tridentatis roseis vel roseo-purpureis, floribus disci tubulosis 5-dentatis, luteis, ovariis pubescentibus.

Habitat.—Natal: on the Drakensberg, Bushman's River, 6,000–7,000 feet alt., July, *Evans*, 53.

Foliorum petioli 2–4 lin. longi, laminæ 1–3 poll. longæ, 9 lin.-1½ poll. latæ. *Capitula* 12–14 lin. diam. *Involucrum* 5 lin. longum. *Corollæ* radii 7 lin. longæ disci 3½ lin. longæ.

In habit and foliage this somewhat resembles *P. Huttoni*, but the involucre is very different.

127. **Gymnopentzia pilifera**, *N. E. Brown* [Compositæ]; fruticosa, ramis subtetragonis erectis decussato-ramosis, ramulis brevibus cum foliis albopilosis demum glabris, foliis oppositis basi vaginato-connatis ad medium vel infra bilobis, lobis integris vel furcatis subteretibus subobtusis, capitulis parvis ad apicem ramorum dense corymbosis discoideis 40–70-floris breviter pedicellatis, involucri hemisphærici bracteis triseriatis adpressis lanceolatis acutis vel subacuminatis fusco-marginatis ciliatis, receptaculo convexo nudo, floribus involucrum excedentibus exterioribus tantum fertilibus, corollæ tubo cylindrico apice abrupte ampliato quinquefido extus glanduloso-papilloso luteo, achæniis teretibus 10-costulatis puberulis.

Habitat.—Natal: on the Drakensberg, near Bushman's River, 6,000–7,000 ft. alt., July, *Evans*, 51.

Ramuli foliiferi et floriferi 9 lin.-1 poll. longi. *Folia* 5–7 lin. longa, lobi ¼ lin. lati. *Pedicelli* 1–3 lin. longi. *Capitula* 2½–3½ lin. diam. *Involucri* bracteæ 1 lin. longæ. *Corolla* 1¼ lin. longa. *Achænia* ⅔ lin. longa.

This differs from *G. bifurcata*, Benth., by its much shorter and racemosely decussate flowering branchlets, the lobes of the leaves being frequently forked, the long white silky hairs which laxly clothe the young shoots and leaves, the much shorter pedicels, more acute bracts of the involucre, and the corolla has a longer and more slender tube, and is much more abruptly dilated in the upper part than it is in *G. bifurcata*.

128. **Gerbera parva**, *N. E. Brown* [Compositæ]; foliis parvis radicalibus longipetiolatis late ovatis obtusis apiculatis basi cordatis marginibus dentatis supra glabris viridibus subtus albotomentosis, scapis quam folia duplo longioribus gracilibus monocephalis nudis vel apice bracteolatis et versus apicem tomentosis, bracteis parvis lanceolato-subulatis glabris, capitulis parvis radiatis, involucri bracteis linearilanceolatis acuminatis exterioribus gradatim minoribus subglabris viridibus vel atropurpureo suffusis, floribus radii 18–22 uniseriatis involucrum subduplo excedentibus, labio antico ligulato apice tridentato albo subtus plus minusve purpureo suffuso, postico lobis duobis minutis dentiformibus composito, floribus disci subbilabiatis lobis quinque subæqualibus, pappi setis scabridis albidis, ovario glanduloso.

Habitat.—Natal: on the Drakensberg, near Bushman's River, in a damp place, 6,000–7,000 ft. alt., July, *Evans*, 57.

Foliorum petioli ¾–1¾ poll. longi, laminæ 4–8 lin. longæ, 3–6 lin. latæ. *Scapi* 3½–4½ poll. longi. *Bracteæ* 1–2 lin. longæ. *Capitula* 8 lin. diam. *Involucri* bracteæ interiores 4 lin. longæ. *Corollæ* radii 4 lin. longæ, disci 2½ lin. longæ.

A well marked species, with flower heads closely resembling those of *Bellis perennis* in size and appearance. Mr. Evans only found it in one place.

129. **Sebæa Evansii**, *N. E. Brown* [Gentianeæ]; caulibus tenuibus repentibus radicantibus ramosis cæspitoso-intertextis glabris, foliis parvis petiolatis ovatis vel subreniformibus obtusis vel subapiculatis basi cuneatis subcarnosis glabris, floribus terminalibus solitariis vel binis pedicellatis vel subsessilibus, calycis profunde quinquifidi lobis lanceolato-oblongis acutis dorso carinatis glabris, corolla calycem duplo excedenti 5-loba lutea lobis tubo angusto longioribus spathulato-obovatis obtusis, staminibus 5 fauci corollæ tubi insertis filamentis edentatis antheris linearibus sagittatis apice glanduliferis multo brevioribus, stylo elongato supra basin bituberculato, stigmate integro.

Habitat.—Natal: on the Drakensberg, Bushman's River, in damp places on flat rocks, 6,000–7,000 ft. alt., July, *Evans* 56; Ingeli Mountain in moist places, 6000 ft. alt., July, *Tyson*, 1378; without locality, *Cooper*, 2761.

Foliorum petioli ½–1½ lin. longi, laminæ 1–2 lin. longæ, 1–2½ lin. latæ. *Pedicelli* ¼–3 lin. longi. *Calyx* 1¾ to 2½ lin. longus. *Corollæ* tubus 2–3 lin. longus, lobi 2–4½ lin. longi, 1¼–2 lin. lati. *Staminum* filamenta ⅓–⅔ lin. longa, antheræ 1–1⅓ lin. longæ. *Stylus* 2⅓–3 lin. longus.

Very distinct from all the other species of the genus by its creeping stems, which are apparently perennial; they root at the nodes and become interwoven into dense masses, bearing hundreds of flowers together, according to a note on Mr. Evans's label.

130. **Nemesia albiflora**, *N. E. Brown* [Scrophularineæ]; herbacea erecta viscoso-pilosa, foliis ovatis subobtusis dentatis basi rotundatis in petiolum abrupte cuneatim decurrentibus supremis sessilibus, floribus axillaribus solitariis, pedicellis tenuibus, sepalis linearibus vel lineari-oblongis acutis, corollæ labiis æqualibus superiore profunde 4-fido segmentis oblongis obtusis, inferiore integro obovato obtusissimo palato bicalloso glanduloso-pubescenti calcare lineari labiis breviore, capsula compressa oblonga apice triangulari-emarginata, seminibus late alatis oblongis utrinque emarginatis minute tuberculatis.

Habitat.—Natal: on the Drakensberg, Bushman's River, growing in old caves, 6,000–7,000 ft. alt., July, *Evans*, 58; without locality, *Gerrard*, 1,230.

Planta 4–18 poll. alta. *Foliorum* petioli 2–6 lin. longi, laminæ $\frac{1}{2}$–$2\frac{1}{4}$ poll. longæ, 4 lin.–$1\frac{1}{2}$ poll. latæ. *Pedicelli* 6–8 lin. longi. *Sepala* $1\frac{1}{2}$–2 lin. longa, $\frac{1}{3}$–$\frac{1}{2}$ lin. lata. *Corollæ* labia 3–4 lin. longa, calcar 2 lin. longum. *Capsula* 3–$4\frac{1}{2}$ lin. longa, $2\frac{1}{2}$–3 lin. lata. *Semina* 1 lin. longa, $\frac{3}{4}$ lin. lata.

Allied to *N. pubescens*, Benth., but the flowers are larger, white with a few violet veins (not yellow as in *N. pubescens*), and the capsule larger and much more deeply emarginate. Possibly a plant collected by Cooper (no. 623) in the district of Albany, Cape Colony, should be referred here, but it is more glabrous, and the palate of the corolla appears to be yellow. I describe from Mr. Evans's specimens.

CCCCXL.—AGRICULTURAL FARMS IN THE BOMBAY PRESIDENCY.

The annual report of the Department of Land Records and Agriculture, Bombay Presidency, for 1892–93, contains an account of the Bhadgaon Experimental Farm, which has lately been sold by Government in favour of a new one which it is proposed to establish in the neighbourhood of Surat.

The advantageous sale of the farm is alone a measure of its success. But the summary of its work for the past ten years by Mr. E. C. Ozanne, the Director of the department, affords striking evidence of the valuable instruction which may be obtained by the Government from such an institution, and of the direct benefits which it confers on local agriculture. To ascertain the limits within which that agriculture is susceptible of improvement is even more important than to prosecute experiments the ultimate success of which may be beyond the area of what is practically possible.

Amongst other things accomplished at the farm is the value of the use of bisulphide of carbon for weevil attack in stored grain. This subject was first brought into notice by Kew in 1879, and the correspondence on the subject is reproduced in the *Kew Bulletin*, 1890, p. 144.

Bhadgaon Farm.

This farm has just been sold for a satisfactory sum. It measured 1,156 acres. Of that area 812 acres were originally transferred from Government waste for the use of the farm, and have been principally used as grass and hay land. The remainder was purchased from time to time from private occupants, often at a high price, for in this area not only was the land already cleared for cultivation, but there were several wells which added to its value. It may be said that the sale price was equivalent to 25 times the assessment on the former area, and to 40 times on the latter. Such a price is a proof, not merely of the increased value of land, but of the improvement made in it during its utilisation as a Government farm. Live and dead stock fetched more than the last valuation made, and the standing crops, which under a favourable season were unusually fine, nearly as large a figure as the gross value of the crop of the previous year, though the purchaser bears the cost of harvest, and the risk of untimely rain and the like. As to buildings, the total expenditure on new erection, renovation, and repairs during the last 10 years came to Rs. 12,800. The farm buildings, together with the bungalow, which originally (1883) cost Rs. 5,000, sold for over Rs. 11,000, a fair price. The whole farm was purchased by a capitalist, who intends to work it as a farm, though he may sub-let portions from time to time.

The reason why the farm was sold is, broadly speaking, its isolated inaccessible situation, but among other reasons were the failure of the Jámda Canal, the unhealthiness of the locality, and the great dearth of labour.

The sale proceeds are in part available for the acquisition of land for another farm in a more suitable locality, and for the erection of farm buildings, and for stocking. In all probability the new farm will be located in the neighbourhood of Surat.

As to the working of the farm in the year under report, I need only say that the kharif season was unfavourable; but the late crops were, partly on this account, good enough to show a profit, on the whole, of Rs. 6 per acre of cropped land, or nearly as large a profit as that shown on the average of the previous five years.

The experiments made were chiefly those which have been carried on for a series of years. They may best be described in the following general remarks, which, I think, show what use the farm has served during the last decade.

It has taught us fully the local systems of cultivation, has in some respects shown that that system is improvable, and has given facts of agricultural value which could not have been otherwise obtained. We have demonstrated the benefit of selection of seed, a point to which local cultivators were and are inattentive, but to which more attention has been attracted, and it is not presumptuous to say that this is a lesson taught which will not be wholly forgotten.

We have proved that it is useless to innovate in implements, though we have found a place for improved sugar-cane mills, for improved bullock hoes, and, within limitations, for the utilisation of English ploughs. We have introduced from abroad, as well as from other parts of India, and successfully grown some new varieties of staple crops, *e.g.* the giant variety of bájri from Gujarát, cotton from Broach and elsewhere, new kinds of jowári, several varieties of wheat from various places, among which the Muzáffarnagar soft white has done very well, and potatoes, the future of which is hopeful.

We have thoroughly studied the merits and demerits of local and other cottons. It has been proved that American long-stapled varieties, though not successful if sown at once as received from America, will succeed well if first acclimatised in Dhárwár, and that such cottons are very useful on light land. We have demonstrated the unwisdom of attempting to oust the local Varádi variety, but have helped the cultivators by placing at their disposal indigenous seed of this variety, improved by selection on the farm, which they have freely purchased. We have kept alive the Jari and Bani kinds of the Berárs. We have proved that the Government interference which was once recommended to restrict the growth of indigenous inferior staples, is injudicious, because the climatic conditions suit the short-stapled varieties best.

Our continued trial of different wheats have shown that soft white wheat, with irrigation, not only succeeds well, but yields better than local hard varieties, and that though at first some deficiency of crop must be suffered, the soft kinds will hold their own, without risk of loss of consistency and colour. The trials have been sufficiently satisfactory to warrant a distribution of soft white seed among cultivators in the Tápti valley. If soft white seed finds a better market than hard, it is certain that it will be grown, and this may also be affirmed with regard to the long-stapled cottons.

We have saved the cultivator much by testing various exotics, often highly recommended, on the farm before allowing the rayat to run the risk of experiments doomed to failure. This was notably the case in respect to pedigree wheats from England and Australia.

Our stock-rearing has been the least successful venture, and has cost us more than any other class of trials; but we have shown that the Mysore breed, though very useful and lasting to a considerable age, cannot be stall-reared with profit. The strain has its merits, and will leave its stamp in the neighbourhood. We find that it is difficult to improve on the local breeds of sheep and goats. The Dumba of Sind soon deteriorates.

In the difficult question of crop diseases and insect attack we have proved the value of several specifics, in particular the sulphate of copper and carbolic acid pickles for smut, and bi-sulphide of carbon for weevil attack in stored grain.

We have demonstrated the unsoundness of the former encouragements given towards the growth of road-side trees in the midst of cultivation as a means of enlarging the area of tree-growth, and shown the direction in which such encouragement is safe.

We have learnt much regarding the effect of manures on black soil. The deduction drawn is a confirmation of a widespread belief as to the inexhaustible character of deep black lands, and that on such land manure to a rabi crop does not pay either when the season is favourable or when it is unfavourable, the factors of rainfall or irrigation proving the more potent. We have demonstrated clearly the immense value, in India, of systematic green manuring, particularly with papilionaceous leguminous crops.

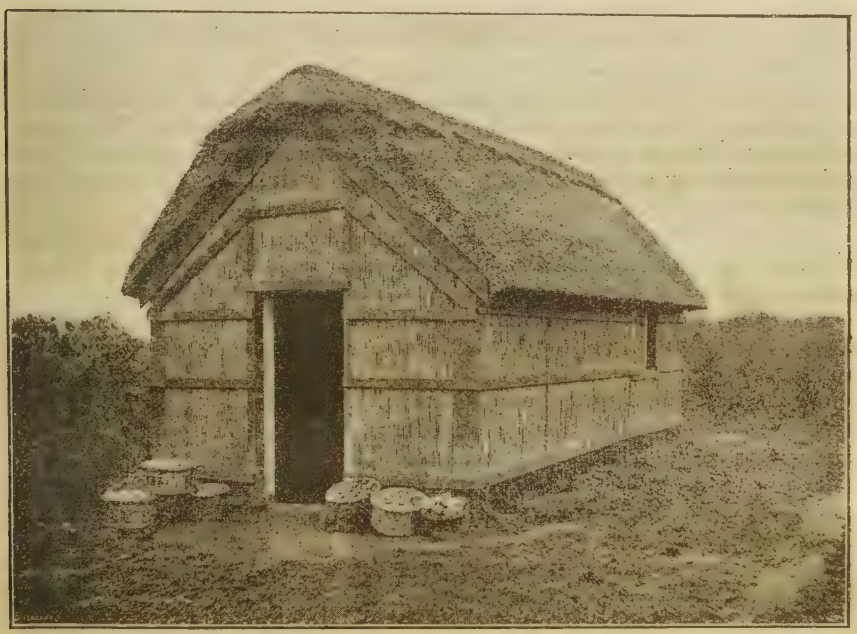
Lastly, the farm has largely increased our knowledge as to the adaptability of foreign systems and special practices, such as ensilage and haymaking, and has given us several well-trained native agricultural experts who will be utilised in the future under more favourable conditions.

CCCCXLI.—STORING HOME-GROWN FRUIT.

A cheap and effective means for storing home-grown apples and pears would greatly increase the value and usefulness of these fruits. The elaborate and costly fruit-rooms attached to large country houses are beyond the reach of persons of moderate means or of small market growers. A simple and practical means of storing fruit would enable it to be brought to market over longer periods, and to some extent obviate the annual and wasteful glut which discourages the grower by reducing the price without giving much benefit to the consumer.

In the *Journal of the Royal Horticultural Society* (vol. xviii., pp. 145–148), a description by Mr. George Bunyard of a fruit room devised by him is published with an illustration. It is 30 feet long by 12 feet wide, is capable of holding 300 kinds of fruits, and costs about 30*l*.

Mr. Bunyard has been good enough to communicate some further particulars of this fruit room to Kew. In view of its simple construction and general usefulness, it is desirable that its merits should be more widely known. The following account is therefore reproduced. The illustration has been lent by the Council of the Royal Horticultural Society :—



Particulars of Fruit Room.

Foundation.—First level the soil and dig out holes for the corners large enough to admit brick piers 14 by 14 inches, or stones about 1 foot square; fix an iron dowel in the centre to receive the corner posts of the structure. Some provision for air, such as air bricks, or an aperture covered outside and inside with perforated zinc, should be provided just above the ground line. If over 20 feet long an extra foundation should be put in at the half distance.

Main Posts.—Make these 6 feet long, 6 inches square, and prepare a hole in the foot to receive the dowel mentioned above; this will keep

the framework firm. The main ground plate should be 4½ by 3, and the top plate of the same size; support and steady these in the usual way with quartering 4½ by 3, and when fixed, choose a dry day to pitch, tar, or cold creosote the lower plates and all the woodwork 2 feet from the ground to protect from damp. The quartering should show an even outside face.

Outside Covering.—The cheapest material will be ¾-in. matchboard, and it may as well be fixed on the rafters as well. Pitchboard 4½ by 1; rafters 3 by 2.

Bonds from one side to the other should be 4½ by 3; if stout they are useful to hold planks, on which baskets can be placed overhead in the roof. To receive the vertical thatch a side board is attached 6 inches wide from the ground to roof, in which the thatch is placed upright, and it is kept in position by lateral splints of wood 3 by 1, shown in engraving.

The thatch may be 18 inches thick on the roof and 6 inches at the sides, and where it can be procured, carex or reed is strongest and most lasting, but it may be of wheat-straw or heather. The eaves should project a good way to protect from damp.

Doors.—An inside and outside door should be provided. They must be made to fit closely to exclude draughts.

Windows.—In order to allow of an inspection of the fruit, windows of 21 oz. glass are inserted, and this saves the use of a candle at storing time, but outside shutters are provided to keep the place as dark as possible. A fruit room is perhaps better without windows.

Ventilation is provided by an opening under the apex of the roof at each end, 1 inch by 9 inches, a small opening being left between the dairy shutters which can be stopped by hay or moss in severe weather. The inside should be protected by perforated zinc, fine enough to keep out wasps and flies.

Thieves and Rats.—In order to protect the contents, a half-inch stout wire netting should be fastened to the matchboard outside so that an entry would be difficult. This is advisable also to keep out rats.

Inside Shelves on which to lay the fruit are readily fixed at the sides; first place uprights 2 inches by 1½ inches from the ground to the roof, and then attach bearers 2 by ¾ on this to the quartering. We find 1 foot between the shelves a very convenient distance. This places the lowest shelf 6 inches from the ground, making six in all up to the eaves. The shelves are made of ¾-in. matchboard, and need not quite meet each other so as to allow a slight circulation of air. Upon these we place lengths of clean wheat straw, so that the fruit shall not quite touch the shelves. In the centre of the fruit room we have a narrow table with a raised edge, made of three lengths wide of matchboard, set on trestles; this is useful for special sorts.

Names.—Get a slip of zinc 4 inches long, turn up one end 1 inch, at an angle of 45, and then slit this angle three times and bend it so that it will hold a neat card; the other end can be slipped under the straw.

The fruit must never be wet when stored, and should be handled very carefully and laid singly on the shelves, but in the case of small apples (russets, &c.) they will keep well three or four thick. Carefully overlook from time to time and remove rotten or spotted fruit, and keep the floor always damp.

These few hints will enable growers to keep late pears to March, and apples to May or June.

CCCCXLII.—NEW ORCHIDS: DECADE 13.

121. **Pleurothallis parva**, *Rolfe;* cæspitosa, caulibus secundariis gracilibus terctibus, foliis crassissimis carnosis linearibus obtusis canaliculatis basi convolutis, racemis brevibus circa 4-floris, bracteis triangulari-ovatis acutis basi tubulosis, sepalo postico oblongo acuto carinato, lateralibus fere ad apicem connatis lineari-oblongis acutis carinatis, petalis obovato-oblongis subobtusis uninerviis, labello trilobo lobis lateralibus parvis falcato-oblongis acutis intermedio oblongo obtuso apice crenulato, columna clavata.

Hab.—Brazil.

Caules ¾–1 poll. longi. *Folia* 8–11 lin. longa, 1½–1¾ lin. lata. *Racemi* 6 lin. longi. *Bracteæ* ¾ lin. longæ. *Pedicelli* ¾ lin. longi. *Sepala* 2½ lin. longa. *Petala* 1 lin. longa. *Labellum* 1 lin. longum. *Columna* ¾ lin. longa.

A small species which was found by Messrs. F. Sander & Co. in a clump of *Cattleya harrisoniana*, Batem., having flowered in their establishment in January of the present year. It belongs to Lindley's section *Brachystachyæ*, and is allied to *P. klotzschiana*, Rchb. f., while in size and general habit it is comparable to *P. sonderana*, Rchb. f. The flowers are wholly deep yellow. No description can be found which agrees with it, and so small a plant might easily be overlooked, especially in this large genus, even in a region so comparatively well known.

122. **Dendrobium robustum**, *Rolfe;* pseudobulbis erectis elongatis medio paullo incrassatis robustis, foliis oblongis oblique obtusis coriaceis, racemis subterminalibus elongatis multifloris, bracteis oblongo-lanceolatis acutis, sepalis lineari-oblongis subobtusis obscure undulatis apice recurvis, mento conico obtuso, petalis lineari-spathulatis obtusis semitortilibus obscure undulatis, labello trilobo lobis lateralibus semioblongis obtusis intermedio oblongo obtuso crispo-undulato, disco subcarnoso quinquecarinato, carinis antice in lamellas 3 elevatas undulatas evolutis, columna brevi.

Hab.—New Guinea.

Pseudobulbi 2–2½ ped. alti. *Folia* 5–6 poll. longa, 1½ poll. lata. *Bracteæ* 2–2½ lin. longæ. *Pedicelli* 8–10 lin. longi. *Sepala* 8–9 lin. longa. *Petala* 10 lin. longa. *Labellum* 9 lin. longum, 4 lin. latum. *Mentum* 4 lin. longum. *Columna* 2 lin. longa.

This species was introduced by Messrs. F. Sander & Co., and flowered in their establishment in January last. It is allied to *D. mirbelianum*, Gaudich., which, however, has longer acute sepals and petals, and much larger bracts. Descriptions of two or three additions to this group have recently appeared, though none of them fit the present plant, which is consequently considered to be new. The flowers are yellowish green, with several light purple lines on the base of the sepals, a broader purple band on the lower half of the petals, and numerous radiating purple lines on the lip, which become slightly reticulated on the front lobe. It is a robust growing plant.

123. **Dendrobium velutinum**, *Rolfe;* pseudobulbis aggregatis fusiformi-elongatis demum sulcatis brevibus apice paucifoliatis, foliis lanceolato- v. elliptico-oblongis apice obliquis subobtusis, racemis

axillaribus bi-trifloris, bracteis brevissimis v. subobsoletis, ovariis triquetris, sepalis lanceolato-oblongis acutis carinatis, mento brevi obtuso, petalis elliptico-oblongis acutis, labello unquiculato trilobo subpandurato velutino minute denticulato lobis lateralibus suborbicularibus intermedio latissime ovato, columna clavata.

Hab.—Burmah, Shan States.

Pseudobulbi 2–5 poll. longi. *Folia* $2\frac{1}{2}$–$2\frac{3}{4}$ poll. longa, 6–10 lin. lata. *Racemi* $\frac{3}{4}$–1 poll. longi. *Pedicelli* $1\frac{1}{4}$–$1\frac{1}{2}$ poll. longi. *Sepala* 1 poll. longa, 3 lin. lata. *Petala* 10 lin. longa, $4\frac{1}{2}$ lin. lata. *Labellum* 10 lin. longum, 7 lin. latum. *Mentum* 1 lin. longum. *Columna* 3 lin. longa.

A very distinct species, which was introduced by Messrs. Charlesworth & Co., Heaton, Bradford, early in 1894. It is evidently allied to *D. trigonopus*, Rchb. f. *Gard. Chron.*, 1887, ii., p. 682, but differs in the absence of markings on the lip, as well as in various structural details. The flowers of *D. velutinum* are uniformly deep yellow, and the lip velutinous. They somewhat resemble those of *D. cariniferum*, Rchb. f., except in wanting the long spur-like mentum which characterises the section *Formosæ*. On the other hand, the strongly three-lobed lip and general aspect of the flower are very different from any of the yellow flowered species of section *Eudendrobium*, so that the exact affinity of these two species, as Reichenbach indicated for the original one, is still doubtful.

124. **Cirrhopetalum gracillimum**, *Rolfe;* rhizomate repenti, pseudobulbis tetragono-ovoideis monophyllis subdistantibus, foliis oblongis obtusis basi attenuatis, scapis elongatis gracilibus 6–9 floris, floribus umbellatis, bracteis lineari-lanceolatis acuminatis, sepalo postico ovato-oblongo longe caudato ciliato, lateralibus angustis prope basin connatis longissime caudatis, petalis triangulari-lanceolatis caudatis ciliatis labello recurvo carnoso lateraliter compresso, columna brevissima dentibus brevibus obtusis.

Hab.—Burmah ?

Pseudobulbi 8–9 lin. longi. *Folia* $2\frac{1}{2}$ poll. longa, 6–7 lin. lata. *Scapi* 6–7 poll. longi. *Bracteæ* $\frac{3}{4}$–1 lin. longæ. *Pedicelli* 2–$2\frac{1}{2}$ lin. longi. *Sepalum* posticum 3 lin. longum; lateralia circiter sesquipollicaria. *Petala* $2\frac{1}{2}$ lin. longa. *Labellum* $\frac{3}{4}$ lin. longum. *Columna* $\frac{1}{2}$ lin. longa.

A very distant species originally sent by T. R. Jarvis, Esq., Laurel Grove, Chelmsford, and afterwards by Mr. J. O'Brien, and Messrs. F. Horsman & Co. It belongs to the group with a ciliate dorsal sepal, but has no near ally among Indian species. The flowers are reddish purple, thus resembling *C. Cumingii*, Lindl., in colour, while in shape they are best compared with *C. vaginatum*, Lindl., both of which are very different in other respects. There is a doubt about the habitat; one record being "India," the other "Burmah ?"

125. **Cirrhopetalum mysorense**, *Rolfe;* rhizomate valido, pseudobulbis tetragono-ovoideis monophyllis distantibus, foliis lineari-oblongis obtusis basi attenuatis, scapis gracilibus 4–5-floris, floribus umbellatis, bracteis ovato-oblongis subacutis, pedicellis gracilibus, sepalo postico ovato-lanceolato subobtuso, lateralibus falcato-linearibus subobtusis, petalis elliptico-oblongis obtusis trinerviis, labello oblongo recurvo medio canaliculato carnoso lævi, columna brevissima dentibus brevibus obtusis.

Hab.—S. India, hills of Mysore.

Pseudobulbi ¾–1 poll. longi. *Folia* 3½ poll. longa, 7–8 lin. lata. *Scapi* 3–4 poll. longi. *Bracteæ* 1½–2 lin. longæ. *Pedicelli* 3½–4 lin. longi. *Sepalum* posticum 4–5 lin. longum, 1¾ lin. longum; lateralia 6–7 lin. longa. *Petala* 2½ lin. longa, 1½ lin. lata. *Labellum* 1½ lin. longum. *Columna* 1 lin. longa.

This species was introduced by Mr. James O'Brien, with whom it first flowered in September 1891, and afterwards in the collection of Sir Trevor Lawrence, Bart. It is allied to the Himalayan *C. maculosum*, Lindl., though different in numerous particulars, both of structure and colour. The flowers are nearly white, with the exception of the lip, which is purple.

126. **Cirrhopetalum nodosum**, *Rolfe*; rhizomate valido nodis paullo incrassatis, pseudobulbis oblongis v. anguste ovato-oblongis monophyllis, foliis lineari-oblongis obtusis basi attenuatis, scapis brevibus 6–7 floris, floribus subracemosis, bracteis lanceolatis acutis, sepalo postico ovato-oblongo acuto minutissime denticulato concavo, lateralibus connatis attenuatis subacutis, petalis ovatis subacutis margine erosis, labello recurvo lineari-oblongo subobtuso, columna brevissima dentibus brevibus acutis.

Hab.—South India, Nilghiri hills.

Pseudobulbi 1¾–2 poll. longi, 1–2¼ poll. distantes. *Folia* 5½ poll. longa, 8 lin. lata. *Scapi* 3½ poll. longi. *Bracteæ* 2–2½ lin. longæ. *Pedicelli* 4–4½ lin. longi. *Sepalum* posticum 4 lin. longum; lateralia 12–14 lin. longa. *Petala* 1½ lin. longa. *Labellum* 1¼ lin. longum. *Columna* 1 lin. longa.

A species first received from Mr. J. O'Brien in August 1892. It is allied to *C. Macræi*, Lindl., having the umbels slightly racemose, as in that species, though the flowers are more nearly like those of *C. cornutum*, Lindl. The habit is peculiar. The rhizomes are stout and woody, and the pseudobulbs some distance apart; the intervals showing several somewhat thickened nodes, in allusion to which the name is given. The flowers are densely speckled with reddish brown on a somewhat lighter ground.

127. **Cirrhopetalum setiferum**, *Rolfe*; rhizomate valido, pseudobulbis oblongis v. ovoideo-oblongis monophyllis, foliis anguste oblongis obtusis basi attenuatis, scapis gracilibus 4–6 floris, floribus umbellatis, bracteis lineari-lanceolatis acuminatis, sepalo postico ovato-oblongo concavo apice setifero eciliato, lateralibus caudato-attenuatis, petalis falcato-oblongis apice subito contractis setiferis eciliatis, labello recurvo subcarnoso lateraliter subcompresso, columna brevissima dentibus linear-spathulatis apice obliquis acutis.

Hab.—Himalaya.

Pseudobulbi 1 poll. longi, 1–2 poll. distantes. *Folia* 9–10 poll. longa, 1½ poll. lata. *Scapi* 9–10 poll. longi. *Bracteæ* 2½–3 lin. longæ. *Pedicelli* 6–7 lin. longi. *Sepalum* posticum 5–6 lin. longum; lateralia 1½–1¾ poll. longa. *Petala* 3½ lin. longa. *Labellum* 2 lin. longum. *Columna* 1 lin. longa; dentes 1 lin. longi.

This species was sent by Mr. James O'Brien in August 1891, and a year later by Sir Trevor Lawrence. The former received it in a case of plants which contained *Pholidota repens*, Rolfe, and certain other novelties, together with one or two old species which indicate the

habitat as somewhere in or near Sikkim, a point which has previously been doubtful. It has the habit of *C. cornutum*, Lindl., but considerably enlarged, and with the addition of long slender setæ on the tips of the petals and dorsal sepal, and very remarkable column-teeth. The setæ indicate an approach to *C. picturatum*, Lodd., the next species, though in other respects it is very different.

128. **Cœlogyne lamellata**, *Rolfe;* scapo erecto 2–3-floro, bracteis lanceolatis acutis deciduis, ovariis hexapteris, sepalis oblongo-lanceolatis acutis carinatis concavis, petalis linearibus acutis, labello trilobo lobis lateralibus semioblongis apice rotundatis intermedio ovato subacuto, disco 9-lamellato lamellis corrugato-undulatis, columna clavata aptera.

Hab.—New Hebrides.

Bracteæ 1¾ poll. longæ. *Pedicelli* 1 poll. longi. *Sepala* 1½ poll. longa, 6–8 lin. lata. *Petala* 1½ poll. longa, 1¼ lin. lata. *Labellum* 1¼ poll. longum, 11 lin. latum. *Columna* 10 lin. longa.

A distinct *Cœlogyne*, sent by Messrs. F. Sander & Co. in August last with the information that it was received from a gentleman whose name and address have been unfortunately mislaid. It is the second species known from the New Hebrides, the earlier one being *C. M'Donaldi*, F. Muell. and Kränzl. in *Œster. Bot. Zeitschr.*, xliv., p. 209, which is obviously allied to the present one, though the sepals are not described as keeled, the keels of the lip only five, the sepals and petals as having some dusky spots, and the lip yellowish flesh colour. The present species has the sepals, petals, and column uniformly pale whitish-green and the lip white. Almost the whole lip is corrugated. The lower half of the front lobe bears five strongly corrugated keels, which extend to the base of the lip, while along the side lobes four additional ones extend, two on either side. The next two pairs of nerves on either hand also bear a number of tubercle-like swellings.

129. **Maxillaria mooreana**, *Rolfe;* pseudobulbis oblongis monophyllis, foliis lanceolato-oblongis acutis, pedunculis brevibus vaginis laxis acutis subimbricatis, bracteis spathaceis oblongo-lanceolatis acutis, sepalo postico elliptico-oblongo acuto subcarinato subconcavo, lateralibus triangulo-ovatis subobtusis, mento conico obtuso, petalis elliptico-lanceolatis acutis, labello integro elliptico-oblongo obtuso disco dense farinaceo, callo late oblongo obtuso, columna clavata.

Hab.—Guatemala.

Pseudobulbi 1½ poll. longi. *Folia* 8–10 poll. longa, 11–20 lin. lata. *Pedunculi* 4 poll. longi. *Bracteæ* 1 poll. longæ. *Sepalum* posticum 11 lin. longum, 5½ lin. latum; lateralia 6½ lin. lata. *Petala* 9 lin. longa, 4 lin. lata. *Labellum* 6 lin. longum, 3 lin. latum. *Mentum* 6 lin. longum. *Columna* 5 lin. longa.

A pretty species belonging to the same group as *M. grandiflora*, and approaching *M. Hübschii*, Rchb., f., which has larger flowers, with differently coloured petals and a lip fully twice as broad. It was introduced by Messrs. F. Sander & Co., and flowered in their establishment in April 1891, when it was named, though the description has not been previously published. It has since been received from Glasnevin. The flowers are cream-coloured, with seven maroon-purple stripes on each petal, except at the apex, and a densely farinaceous lip, narrowly margined with the same colour.

130. **Angræcum Smithii**, *Rolfe;* aphyllum, radicibus fasciculatis gracilibus subteretibus subflexuosis pallide viridibus, caule brevissimo, racemis gracilibus brevibus 8–12-floris, bracteis lanceolato-oblongis acutis parvis, sepalis petalisque lineari-lanceolatis acutis suberectis, labello lineari-lanceolato acuto suberecto, calcare recurvo-patenti conico, columna brevissima, pollinarii stipite simplice.

Hab.—Mt. Kilimanjaro.

Radices 4–6 lin. longæ. *Racemi* 1 poll. longi. *Bracteæ* ½ lin. longæ. *Pedicelli* ¾ lin. longi. *Sepala* et *petala* 1 lin. longa. *Labellum* 1 lin. longum; calcar vix 1 lin. longum.

A minute leafless species sent to Kew by Consul C. S. Smith, of the Kilimanjaro Delimitation Commission. It flowered early in 1894, and again during the present year. It was found growing on the same branch with *Angræcum bilobum*, var. *Kirkii*. It is like a miniature edition of *A. guyonianum*, Rchb., f., but differs in having roots only half as thick, racemes several times shorter, and distinctly smaller flowers. As the latter species has recently been referred to *Mystacidium* it seems advisable to point out that, like the present one, it has only a single stipes to the pollinarium, and certainly does not belong to that genus. It has also been transferred to *Gussonia*, which, however, has only the leafless habit to stand upon, and even that is fallacious, for leaves are sometimes developed, though they die away early. It has seven published synonyms (*Mystacidium globulosum* and *M. radicosum*, Durand & Schinz, are not only synonymous but originally based on the same number), and as at least half of them have arisen through pure misconception it seems desirable to append these remarks, otherwise the present species might also be transferred to *Mystacidium*.

CCCCXLIII.—IBOGA ROOT.

(*Tabernanthe Iboga*, Baill.)

With plate.

The roots of the plant known as Iboga in the Gaboon and Bocca on the Congo, possess tonic properties, and in large doses are said to stimulate the nervous system. Up to quite recently the only information respecting it was contained in the *Catalogue des Produits des Colonies Françaises*, at the Paris Exhibition, 1867, p. 108. Specimens were exhibited with the following note by M. Griffon du Bellay: "Gabon, *Tabernæmontana* (Sp. ?). Iboga des gabonnais. Les racines toniques, à haute dose, sont un excitant du système nerveux." A note based on this is also to be found in Moloney's *Forestry of West Africa*, p. 384.

Latterly some specimens of the roots and twigs were communicated to Kew by Dr. Hugo Müller, F.R.S. who stated "the roots called Bocca are used and much valued on the lower Congo as a febrifuge."

The plant according to Baillon, who first identified it, is known at Cape Lopez as Iboga, but it has other local names. It is the Aboua of the Pahounis and Obouété of the Gaboon.

Recently a figure and description were published in *Hooker's Icones Plantarum* [4th Series], tab. 2337. It belongs to the natural order

Apocynaceæ, *Tabernanthe Iboga*, Baill. (in *Bull. Soc. Linn.* Paris, i. 782); was collected by Mann in the Gaboon (No. 943), and by Welwitsch in Angola (No. 5950). Professor Oliver who drew up the description in the *Icones* adds "first discriminated by Dr. Baillon, but its position left doubtful though its points of contact with *Tabernæmontana* and other groups of *Apocynaceæ*, were clearly indicated by him. Were it not for the complete consolidation of the carpels one would hardly hesitate to merge it in *Tabernæmontana* itself. . . . . It is described as having a large bitter root, eaten by the Gaboon people. 'Ils la disent enivrante, aphrodisiaque, et avec elle ils prétendent qu'on n'éprove aucun besoin de sommeil.' Dr. Baillon in his *Hist. de Plantes*, x. 170, says the Obouété of the Gaboon is a 'plante médicamenteuse des plus remarquables.'"

This is substantially all that is known of the plant at present. Further material is kindly being sought for by Dr. Hugo Müller. When this arrives it may be possible to investigate the medicinal properties of the plant more fully.

Reference to Plate.

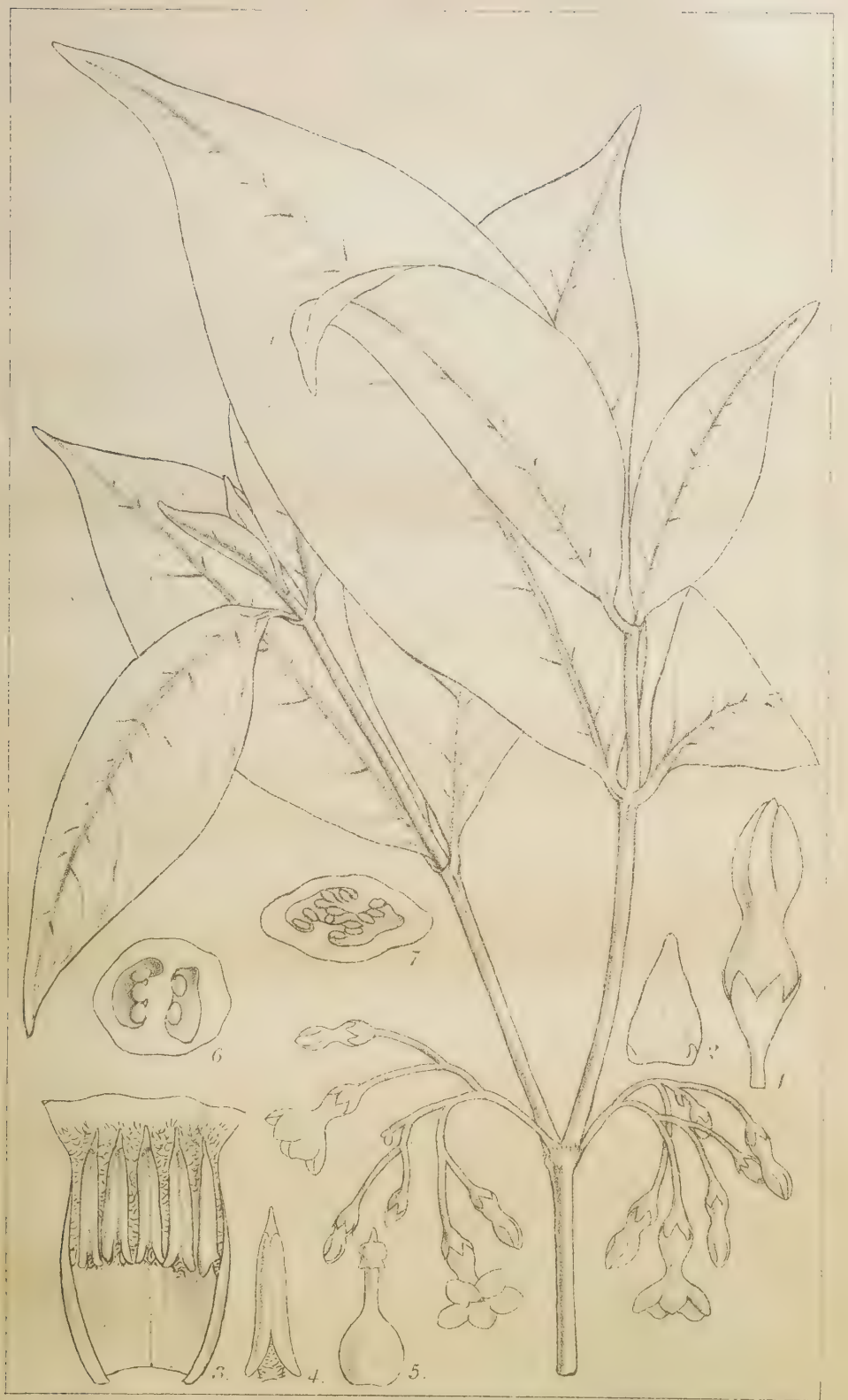
Tabernanthe Iboga, Baill.

Fig. 1. Bud. 2. Calyx segment and gland. 3. Corolla-tube laid open. 4. Anther. 5. Pistil. 6. Transverse section of ovary near base. 7. Same near middle. *All enlarged.*

CCCCXLIV.—SIAM PLANTS.

Mr. F. H. Smiles, a gentleman attached to the Royal Survey Department of Siam, has presented a small collection of dried plants made by himself in the mountains of the interior of the northern part of that country. The specimens are not all that could be desired, this being Mr. Smiles's first essay in collecting and drying plants, undertaken without any previous instruction; but they include several interesting novelties sufficiently represented for description. Remarkable among other things is a new genus of *Scitamineæ* of quite an aberrant type. There is also a very distinct new species of *Argostemma* (*Rubiaceæ*), differing from those previously known in its small dimensions, exceeding slenderness, and one-flowered stems. Mr. Smiles left England again for Siam in the middle of December with the intention, if circumstances permitted, of making further botanical collections. Judging from what is known of the countries to the north, there must be a very rich flora in Upper Siam.

The new genus of *Scitamineæ* which is now described is remarkable in several particulars, but more especially in having unisexual flowers, and in the absence of a labellum and of staminodia of any kind whatsoever. The specimens consist of two slender stems, six to nine inches high, naked below, as if pulled away from a tuberous rootstock, and bearing two or three grass-like leaves and a terminal nodding inflorescence, with coloured bracts and bracteoles. The flowers are minute and cylindrical, and almost hidden by the folded distichous bracteoles, each of which bears one flower in its axil. There are about three or four dense globular spikelets about half-an-inch in diameter in each



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Tabernanthe Iboga, Baill.

inflorescence, borne on slender stalks, springing from the axils of relatively large bracts. From the note accompanying the specimens, it would appear that the bracts and bracteoles are of a dark purple red, and the very small flowers yellow; but Mr. Smiles, not being a botanist, does not correctly discriminate between flowers and bracts. A figure of this interesting plant will shortly be published in *Hooker's Icones Plantarum.*

Achilus, *Hemsl.* [Scitaminearum-Zingibercarum genus novum].—*Flores* minuti, in axillis bracteolarum solitarii, unisexuales, ut videtur, vere monoici. *Flores* ♂ : *Calyx* cylindrico-tubulosus, obscure trilobatus. *Corolla* calycem dimidio superans, alte trilobata, lobis ovato-oblongis obtusis. *Staminodia* nulla. *Stamen* unicum; filamentum filiforme; antheræ exsertæ loculi paralleli, contigui, connectivo non producto inappendiculato. *Flores* ♀ : *Calyx* tubulosus, cylindricus, brevissime 3-lobatus. *Corolla* cylindrica, calycem paullo superans, etiam obscure trilobata. *Staminodia* nulla. *Stylodia* 2, filiformia. *Ovarium* 1-loculare, placentis parietalibus, ovulis numerosis; Stylus filiformis. Fructus ignotus. *Herba* nana, annua, gracilis, caulibus simplicibus. *Folia* graminoidea. *Inflorescentia* terminalis, nutans, e spicis paucis densis distantibus graciliter pedunculatis sistens et bracteis amplis coloratis ornata. *Flores* bracteolis distichis arcte complicatis etiam coloratis fere occultis, inferiores ♀, supremus vel superiores ♂.

Achilus siamensis, *Hemsl.;* puberula caulibus 2–3 foliatis, foliis distichis longe vaginantibus, vaginis apertis ciliolatis apice transversim breviter ligulatis, lamina lineari-lanceolata acutissima atque vagina multinervia, supra vix hispidula, bracteis sessilibus ovali-oblongis crebre longitudinaliter venosis, venis prope marginem connexis, bracteolis, rotundatis latioribus quam longis, pedunculis puberulis, floribus papillosis, ovario ruguloso.

Habitat.—Siam: open places on Mount Putsum, near Nam Kawng, at about 2,000 feet, *F. H. Smiles.*

Caules 6–9 poll. alti. *Folia* absque vagina 1½–2 poll. longa. *Inflorescentia,* 1½–2 poll. longa. *Bracteæ,* 6–9 lin. longæ. *Bracteolæ* exteriores complicatæ circiter 3 lin. diametro. *Flores,* 3–4 lin. longi.

CCCCXLV.—MISCELLANEOUS NOTES.

News has been received of the death, on January 11th, of Mr. John Gray, Curator of the Botanic Station at Castries, St. Lucia. Mr. Gray was about 60 years of age, and before going out to the tropics had had wide experience in English gardening. He converted an unwholesome swamp at Castries into a beautiful garden, and started the cultivation of numerous plants in the island. Latterly his health had suffered from recurring attacks of fever. The following note is taken from the *Voice of St. Lucia* for January 17th, 1895 :—

"It is our painful duty to report the death of Mr. John Gray, Curator of the Botanical Station at Castries. Mr. Gray came to St. Lucia in 1886, on the recommendation of Mr. Morris, the Assistant Director of Kew Gardens, who has always taken a very keen interest in this, and, indeed, in all West Indian colonies. Mr. Gray had been for

many years head gardener to Earl Brownlow. He went thence, at the instance of Colonel Talbot, to his estate, Worthy Park, Jamaica, to conduct some experimental cultivation which he was anxious to promote. There Mr. Gray acquired good experience in the cultivation of tropical industrial products. He will be specially remembered in connexion with the exhibit of perfumes extracted by him from West Indian flowers—a marked feature of the Jamaica Court at the Col.-Ind. Exhibition, 1886. Mr. Gray did good work in planning, laying-out, and tastefully planting what was a half-filled swamp when it first came into his hands, but which in three years time he transformed into a beautiful garden, which, though small, is an ornament to the town, and a much appreciated resort and breathing place for the townspeople. He introduced many varieties of plants and flowers, and the collection of roses at the station was at one time perhaps the finest in the West Indies. In the matter of economic plants he raised and distributed thousands of cacao, coffee, nutmegs, a few cola and sisal. On the whole, from one cause or another, the economic section of the station was not so apparent a success latterly as the purely horticultural."

Botanical Magazine for January.—All the subjects figured in this number were drawn from plants flowered at Kew. *Talauma Hodgsoni*, one of the handsomest magnoliaceous trees from the Himalayan region, flowered in the temperate house after twenty years' cultivation. *Acidanthera æquinoctialis* is an iridaceous plant inhabiting the Sugarloaf Mountain, Sierra Leone, corms of which were sent to Kew by Captain Donovan in 1893. *Lonicera Alberti* is a pretty honeysuckle of the *Xylosteum* section discovered in Western Turkestan by Albert von Regel. *Acacia spadicigera* is one of the few species of the genus having very large horn-like spines, which are usually inhabited by ants. It is a native of Central America. *Cyrtopodium virescens* is a Brazilian orchid of the tribe *Vandeæ*, introduced by Messrs. Sander of St. Albans.

Hand-List of Trees and Shrubs grown in Arboretum. Part I.—Polypetalæ. The purpose and scope of this publication is explained in the following extract from the Preface:—

The present is the first of a series of Hand-lists of the collections of living plants cultivated in the Royal Gardens which it is intended to issue from time to time.

It is hoped that they will be found useful in indicating to visitors interested in particular groups of plants, the species which Kew already possesses. In the hands of correspondents they will serve to show in what directions the collections may be added to. It is further hoped that they may be found of some value in establishing an approximate standard of nomenclature, which is often much confused in gardens and too frequently erroneous.

This is particularly the case with woody plants (shrubs and trees) grown in the open air. The preparation of the present list has accordingly been taken in hand; it represents the work of many years, and has only been accomplished with considerable labour.

A rough census of the species and distinct varieties of plants cultivated at Kew gives the total number as, approximately, 20,000. Of these 3,000 are hardy shrubs or trees.

The first catalogue of the plants cultivated at Kew was that of Sir John Hill, published in 1768 (second edition 1769). This was entitled *Hortus Kewensis*, and was an octavo volume of 458 pages. It has been reckoned to contain 3,389 species, of which 488 were hardy trees and shrubs.

In 1789 the elder Aiton published a more critical *Hortus Kewensis*, in which 5,535 species are enumerated.

The younger Aiton published 1810 to 1815 a second edition in five volumes, "and in 1814 a catalogue or epitome, as it is called, of the species contained in the five volumes, for the use of practical gardeners; it contains . . 314 additional species, the total number being 11,013."

This is the latest comprehensive list of plants in cultivation at Kew which has been published.

Occasionally lists of special collections have been issued since this date. Catalogues of the Ferns were issued in 1845, 1856, and 1868; of the Hardy Herbaceous plants in 1853; of Succulent plants in 1856; of *Aroideæ* in 1878; of *Bromeliaceæ* in 1879; of *Aloineæ*, *Yuccoideæ*, and Agaves in 1880; of Economic plants in 1881; of Palms in 1882; of Primulas in 1886; and of Orchids flowered at Kew, in 1891. Since 1885 lists of seeds available for distribution with other botanical establishments have been issued annually.

An Arboretum has been for more than a century a feature of the Kew establishment. Perhaps it dates its formal commencement from 1762, when "all the Duke of Argyll's trees and shrubs were removed to the Princess of Wales's garden at Kew, which now excels all others, under the direction of Lord Bute."

The old Arboretum in part still exists near the main gate on Kew Green. Many trees have perished and have been removed from age; but those that remain include some of the finest specimens of rare trees in the Gardens." (Some further particulars are given in the *Kew Bulletin* for 1891, page 316.)

The Botanical Garden, which was opened to the public in 1841, with Sir William Hooker as Director, comprised only about 11 acres; it included however, the old Arboretum. In 1844, by permission of the Queen, about 47 acres, including the ornamental piece of water in front of the Palm House, was added for the formation of a Pinetum. This was too near the smoke of suburban London, and it has lost its distinctive character. But many of the trees planted at this time are now of considerable magnitude.

The "Pleasure Grounds and Gardens at Kew" were in the occupation of the King of Hanover for sporting purposes at the time the Botanic Garden was given to the nation. The woods were filled with rough scrub for cover. In 1845 they were placed in the charge of Sir W. Hooker, with the "intention that they should be formed into a national arboretum." A plan for the purpose was prepared in 1846 by W. A. Nesfield. The main features were carried out at the time, and the general principle has been worked upon ever since. In 1850 the nursery was formed. In 1870 the new Pinetum was commenced.

The late Director, Sir Joseph Hooker (1865–1885), spared no pains to amass the most complete collection which could be formed of hardy woody plants. These were obtained from public and private correspondents and establishments at home and abroad, partly by purchase, partly by gift and exchange. They had necessarily for the most part to be planted under the names with which they were received, and these, from confusion or accident, were often erroneous.

A great difficulty arose in rectifying this, from the fact that woody plants can rarely be identified with any accuracy till they flower or fruit. The process of accurate identification in an extensive arboretum is necessarily, therefore, a very slow one.

A further difficulty arises in a public arboretum from the fact that, though the specimens were all carefully labelled with their history and a corresponding register kept, these labels are apt from time to be misplaced or lost. To remedy this a separate Herbarium was formed, in which a specimen was preserved of every species or variety planted out, with the name under which, and the source from which it was received. By reference to this Herbarium it was possible in a large number of cases to correct the nomenclature.

By this means it has also been possible to draw up the list of which the present is a first instalment. It must still be regarded as in some sense provisional and open to correction. But it has been possible to reduce an immense number of "trade" and "garden" names, and to bring the nomenclature to something like a standard.

It is only necessary to add that in the present *Hand-List* 994 species, with 640 varieties, have been enumerated and their names as far as possible verified. The number of synonyms given is 2,127.

Flora of Mount Kinibalu.—In the *Kew Bulletin* for October, 1892, p. 249, it was announced that Drs. H. A. and G. D. Haviland had presented Kew with a valuable collection of dried plants, collected by themselves on Mount Kinibalu, North Borneo. As a matter of fact, however, it should be explained, that although the two cousins travelled together, it was Dr. G. D. Haviland alone who did the botanizing. This fine collection has been worked out by Dr. O. Stapf, Assistant for India at the Herbarium, together with all previously collected plants from the same region, published and unpublished, notably those collected upwards of 40 years ago by Sir Hugh Low, and by Mr. F. W. Burbidge in 1877. The results appear as the second part of the fourth volume (Second Series, Botany) of the *Transactions of the Linnean Society*. This is one of the most important and interesting contributions to geographical botany published during the past year, especially in relation to the migrations of plants. The total number of flowering plants enumerated is 360, which Dr. Stapf estimates may be one-fourth or one-fifth of the whole phanerogamic flora of the mountain, and nearly 60 per cent. of these, so far as at present known, are endemic. The relationship with the Australasian flora are especially interesting.

Renewal of Heating Apparatus in Palm House.—The *Kew Report* for 1877 contained an account of the remodelled apparatus for heating the Palm House which was put in during that year. Up till the winter of 1893–4 this worked in a completely satisfactory way. The temperature at that period was often severe, and the heating had to be pressed. To this cause, as well as to a probable deterioration in the large iron castings used, due possibly both to alternations of temperature and to occasional vibrations from the movement of the water, may be attributed the serious "bursts" which took place on two several occasions at a very critical time. By the skill and unremitting energy of the engineering staff of the Royal Gardens, the fractured mains were patched up, and the collection suffered no appreciable damage from cold.

It had, however, become evident that the heating apparatus had reached a state which was extremely precarious. Her Majesty's Office of Works therefore included, in the estimates for 1894–5, a sum of 1,000*l.* for its partial renewal. During the summer of that year this was satisfactorily accomplished for the north wing. The ceiling of the furnace room was raised 2½ ft., and all the pipes which had hitherto either been buried in brickwork or carried under the beds, were renewed and re-arranged so as to be immediately accessible.

These operations involved clearing a large portion of the north wing. The opportunity was therefore taken to execute other necessary repairs, and to repaint the whole of the interior.

The total length of hot-water pipes in the Palm House has been estimated at 22,600 ft., or about 4⅓ miles. Notwithstanding, it has always been difficult to maintain a satisfactory temperature in the north wing during winter. This was especially the case during wind, the cold air forcing its way through the "laps" of the glass, which necessarily fit imperfectly, owing to the curved surface of the house. To counteract this, and avoid the necessity of pressing the boilers in severe weather, an additional 4 in. pipe was carried round the entire north half of the house and attached to a new auxiliary boiler.

In 1877 a hot-water pipe was carried round the gallery, "the heat from which replaces the loss by cooling in the dome, and consequently checks the drip and downward draughts, which had long proved so injurious to the plants." This had proved so satisfactory in working that it was determined last year to extend the principle, and a 2½ in. pipe was, in addition to the lower auxiliary pipe, carried round the inside of the lantern of the north end.

The general result of these improvements has been to render it possible to attain, during the present winter, a steady and sufficient temperature in a way impracticable before. The whole of the works were carried out under the direction and superintendence of the resident Assistant Clerk of the Works, Mr. J. Allen.

Green-glass in Plant-houses.—It is well known that the use of glass of a green tint has for half a century been a characteristic peculiarity of the plant-houses at Kew.

It was adopted as the result of reports made to the Office of Woods in 1845–6 by the late Mr. Robert Hunt, F.R.S. These reports are to be found in the appendix to his "Researches on Light" (2nd ed. 1854). He states (p. 379):—"It is required, according to Sir W. Hooker's letter of the 23rd of November, that a glass should be selected for the Palm House at Kew, 'so much stained as will deprive the glass of its scorching character and not affect the vegetation.' . . . . Green glass, coloured with oxide of copper to a tint which may be called pea-green, will admit light and chemical power in the same proportions as white glass, but will obstruct the passage of those rays which produce the 'scorching' desired to be avoided." He further adds (p. 381): "I have selected a glass . . . . which is so slightly tinted as to present no appearance, by either reflected or transmitted light, materially different from the white sheet glass already employed for glazing at Kew. . . . . This glass admits most freely the permeation of all the luminous and chemical rays, and obstructs only those heat rays which are remarkable for their peculiar scorching power." The glass which at any rate of late years has been used at Kew is certainly of a much darker tint than that prescribed by Mr. Robert Hunt, and is

probably coloured with iron and not with copper. Prof. Norman Lockyer, C.B., F.R.S., has been so good as to examine the light transmitted by it. He reports :—

"Cuts off red and blue ends of spectrum pretty equally.

"Red-yellow reduced quite nine-tenths in intensity.

"Blue reduced quite nine-tenths in intensity.

"Transmits a fair proportion of orange, but most of light transmitted is yellow green."

It is probable that this is more severe than anything that was intended originally. But it is difficult, over a long period, without special precautions, to adhere to a standard. Mr. Robert Hunt (p. 383) stated that "the only difference which" his selected glass "produces upon the rays of light is that it cuts off a smaller portion of the lowest red ray, and slightly diminishes the length of the yellow ray by increasing the green."

It is well known that the effect of light of different degrees of refrangibility upon vegetation is by no means uniform, but has important peculiarities characteristic of particular parts of the spectrum. This is too technical a matter to enter upon here. But it is sufficient to say that the green glass in recent use at Kew, according to the modern accepted data of vegetable physiology, intercepted about half the effective influence of ordinary sunlight on the processes of plant life.

The general effect upon vegetation as a whole is clearly exemplified by the recent experience of Zacharewicz (*Annales Agronomiques*, Dec. 25, 1894, pp. 585–589). He cultivated strawberries under glass of different colours with the following results (p. 589) :—

Orange gave the maximum of vegetation, but at the expense of the quality, size, and earliness of the fruit.

Ordinary glass gave the finest and earliest fruits.

Violet gave the maximum production of fruit but at the expense of size, quality, and earliness.

Red, blue, and green were all injurious to the vegetative development of the plants, which became etiolated.

These results are, on the whole, in accordance with theory; it is not, however, obvious why violet should be less injurious than green.

Of late years at Kew the object aimed at in the use of green glass has been attained in great measure by the increasing haziness of the sky, due to the smoke produced by the rapid extension of London to the south-west. The extreme obscurity of the winter of 1885–6 showed that no available sunlight could possibly be spared. It became obvious that for the future the plant-houses must be so constructed as to exclude as little of the available sunlight as possible. The use of green glass was therefore abandoned in 1886 in all the houses except the fern-houses and the Palm-house.

In 1889 the experiment was made of substituting white glass for green in the east wing of No. II. (tropical fern-house). This was the result of the observation of the successful cultivation by Sir Trevor Lawrence, Bart., P.R.H.S., of ferns with full exposure to the light at Burford, near Dorking. The improvement in the growth of the plants was remarkable. In 1892 a portion of the west wing was also reglazed in the same manner, and the new temperate fern-house (No. III.) was wholly glazed with white glass. The result with the Gleichenias and other half-hardy ferns was everything that could be desired. As the result of these progressive experiments, it has now been determined to abandon the future use of green glass altogether at Kew.

There are no doubt plants which require shade and will not tolerate direct exposure to the sun. In the tropics Cacao can only be cultivated with the aid of some shade tree. Filmy ferns at Kew are at once killed by direct sunlight. But shading and altering the composition of the light are by no means the same thing.

The use of green glass at Kew involved a curious practical difficulty. It is almost impossible to obtain glass which is absolutely free from manganese. But the green glass which of late years at any rate has been employed at Kew, is almost certainly coloured with iron protoxide. Manganese is used in the manufacture, in the form of manganese dioxide. This is at once reduced to the sesquioxide; but under the influence of light the iron protoxide in the glass gradually steals oxygen from the manganese sesquioxide, reducing it to the oxide. The glass becomes colourless. The manganese oxide then begins to absorb oxygen from the air, and again reaches the state of sesquioxide, which gives the glass a pinkish tint. Every stage of the transition from green through white to pink may be observed in the glass of the Palm-house.

Glass partly decolourised in this manner probably closely approximates to that which Mr. Robert Hunt originally prescribed. Prof. Lockyer finds that a specimen examined by him "cuts off, very slightly, at red end, and generally throughout the spectrum." In a specimen in which the decolourisation had been completely effected, he found "no appreciable effect on any portion of spectrum to the eye." It had, in fact, become practically identical with ordinary white glass.

Yunnan Plants.—An old Chinese correspondent of Kew, Mr. W. Hancock, F.L.S, to whom it is indebted for several small collections of dried Chinese plants, has sent a further collection, comprising about 150 species of flowering plants and 120 ferns. The specimens are admirable, and often copious. These plants were collected in the neighbourhood of Mongtze, or "Mengtsz," as Mr. Hancock writes it. This place is situated in South-eastern Yunnan, just within the tropics; and although the plants were not collected at great elevations, 4,000 to 6,500 feet, they were all of a temperate or sub-tropical type. Like other parts of the vast province of Yunnan, this appears to be exceedingly rich in local species, and there can be no doubt from a cursory examination of the collection that it contains a considerable sprinkling of undescribed ones. There are probably at least 10 new ferns, a large number considering the wide range of ferns generally. Among flowering plants a species of *Jasminum*, allied to *J. nudiflorum*, is perhaps the most conspicuous. It has primrose-yellow flowers with broad overlapping petals of great substance, and they are from $1\frac{1}{2}$ inch to $1\frac{3}{4}$ inch in diameter There is also a remarkable new species of *Brandisia*, with long terminal racemes of "rich red" flowers. A *Rhododendron* having very large solitary or geminate white flowers is probably new, and several elegant *Cyrtandreæ* are different from anything Kew previously possessed. The very large and distinct *Rosa gigantea*, Collett, is also among the plants collected. Some of the most striking novelties will be figured in an early part of *Hooker's Icones Plantarum*.

Perim Plants.—Mr. J. B. Farmer, F.L.S., Assistant Professor of Botany, Royal College of Science, South Kensington, had an opportunity of landing on this island on his return from Ceylon a few years ago, and

he collected specimens of all the plants he found, a set of which he has lately given to Kew. The island is treeless, in fact, destitute of woody vegetation beyond a bushy *Statice* and *Cassia obovata*. Indeed, vegetation of any kind is exceedingly sparse, and the only plant seen in quantity was *Cleome brachycarpa*. Altogether only eleven species of flowering plants were collected, all of them known from the neighbouring mainland on one or both coasts.

Plants from Lake Tanganyika.—Mr. Alexander Carson has presented a further collection of about 100 species of plants from this interesting country. It is estimated that 30 of the species are new to science, and descriptions of them will appear in an early number of the *Kew Bulletin*. The novelties belong chiefly to the orders *Leguminosæ* and *Compositæ*, but there are several other more remarkable plants among them, notably a grass (*Tristachya*) with a singularly bearded inflorescence, an erect species of *Gloriosa*, several *Asclepiads*, and a fine species of *Tachiadenus*, a genus of the *Gentianeæ*, previously only known to inhabit Madagascar.

Books recently presented to the Library.—Professor C. S. Sargent has presented a copy of his *Forest Flora of Japan;* Mrs. Gray has presented the *Letters of Asa Gray;* Mr. W. Martin Conway, who gave the collection of dried plants made on his Karakoram expeditions, has now sent a copy of the *Scientific Reports* connected therewith; the Board of Agriculture has presented a set of the *Rothamsted Memoirs* by Lawes and Gilbert; from the Trustees of the British Museum a copy of Lister's *Monograph of the Mycetozoa* has been received; Dr. Gregorio Chil has presented De Viera's *Diccionario de Historia Natural de las Islas Canarias;* from the author, E. Raoul, came two copies of *Culture du Caféier;* from the authors, E. L. Rand and J. H. Redfield, the *Flora of Mount Desert Island, Maine;* from the author, T. R. Sim, *Sketch and Check-list of the Flora of Kaffraria;* and from Professor J. W. H. Trail a copy of *The Little English Flora* has been received.

Through the Bentham Trustees Kew has also been able to complete the sets of the publications of various foreign botanical societies. Among the more important are the *Verhandlungen der K. K. zoologisch-botanischen Gesellschaft in Wien*, from 1871 to 1894; the *Actes de la Société Linnéenne de Bordeaux*, from 1873 onward; the *Abhandlungen des naturwissenschaftlichen Vereines zu Bremen*, complete from the beginning; the *Arbeiten des Botanischen Museums zu Hamburg*, from the commencement; and the publications of the principal societies of Australia and New Zealand.

Typhoon in Hong Kong.—Extract from letter from Superindendent, Botanical Department, Hong Kong, to Royal Gardens, Kew, dated Hong Kong, October 16, 1894.

"On the 6th of this month Hong Kong was visited by a typhoon which was the worst experienced for exactly 20 years. Our gardens were terribly wrecked in 1874, and now they are again reduced to a scene of desolation. All our *large* trees have been either totally destroyed or reduced to little more than stumps or bare poles."

"Outside the Gardens the trees on the hills have come through pretty well, but the shade trees in the streets and roads have been terribly mutilated. Most of the roads and streets were blocked with fallen trees and broken limbs."

"Between September 10th and October 6th we had to prepare for five typhoons which approached the Colony, but as the centres passed some distance south we had only strong gales for four of them."

Meadow Plume-Thistle (*Cnicus pratensis*, Willd.) — The plant known as the Meadow Plume-Thistle, *Cnicus pratensis*, Willd. (Carduus pratensis, *Huds.*) is a perennial, rather local in character, but found rather frequently in the southern counties of England. It is widely spread on the continent. The stems are downy and mostly single-flowered. The leaves are green above, cottony beneath, but not very white. The flowers are dark purple with the pappus dirty white.

The plant affects wet pastures in various parts of the country, and is often a troublesome weed. The following letter shows it has spread to such an extent in certain parts of Somersetshire as to render good pastures almost worthless. There is no use to which the plant could be applied, and it is evident that nothing can be done except to get rid of it by persistent weeding before the plants flower each year.

Mr. W. Lang to Royal Gardens, Kew.

Curry Rivel, Somersetshire,
July 5th, 1894.

Sir,

By this post I send you a plant the name of which I should be glad to know. Within the last few years it has spread and overrun a large tract of land in West Sedgmoor which formerly produced good pasture, but which is now in consequence worthless or nearly so for grass-growing purposes. There is, I suppose, no commercial value in the plant or any extract which might be got from it. The local name is pronounced something like "Tabbie-howe," but although I have tried to get at the origin I am unable to do so.

* * * * * *

I am, &c.
(Signed) W. Lang.

The Director,
Royal Gardens, Kew.

Yam Beans.—Information respecting the Yam bean (*Pachyrhizus tuberosus*, Spreng.) was given in the *Kew Bulletin*, 1889, pp. 17 and 62 (with plate). An account of the closely-allied short-podded Yam bean (*Pachyrhizus angulatus*, Rich.) was given in the *Kew Bulletin*, 1889, p. 121 (with plate). Both these plants are of interest. The roots of the former "afford a plentiful supply of very wholesome food"; while, according to Dr. Trimen, "the pods are a very useful vegetable." Of the short-podded Yam bean a starch is made from the tubers, or they are eaten when young as in the case of *P. tuberosus*. The young pods, however, cannot be used as a vegetable, as they are hairy and cause irritation. The following analysis of tubers and seed of *P. tuberosus* has recently been published in the *Report of Agricultural Work at*

British Guiana, by Messrs. Harrison and Jenman, for the years 1891–92, p. 70 :—

Pachyrhizus tuberosus and P. angulatus.—"Yam beans." These two species are little cultivated, and only for the tuberous roots, the beans, when mature being, in a measure poisonous. They have been used, however, when very young, sliced and cooked as French beans are used. The tubers of *P. tuberosus* grow as large as a medium or large sized turnip, are as poor in quality, and without the good flavour. The other produces larger tubers if allowed to go on from year to year, the plants being perennials. One species is dwarf, growing about a foot high, while the other is several feet high, requiring a hedge or trellis to grow upon. They are of American origin but now widely dispersed in all equatorial and warm countries.

Yam Bean. (Pachyrhizus tuberosus.)

	Tubers.	Seed.
Water	82·25	13·50
Fats	·30	25·04
Resin	·13	2·14
*Albuminoids	1·05	20·94
Sucrose	1·29	6·95
Glucose	·26	·31
Pectose, gums, &c.	1·62	1·58
Starch	8·46	9·00
Digestible fibre	2·14	12·20
Woody fibre	·66	4·43
Mineral matters	1·84	3·91
	100·00	100·00
Containing nitrogen	·166	3·35

* Both the tubers and beans contain a poisonous resin, the latter yielding over two per cent. of it. This resin was found to be a very active fish poison. Apart from the presence of this substance, the beans exhibit a very high value as food stuffs, much resembling in composition the celebrated Soy-bean (*Glycine Soja*).